

WHAT IS CLAIMED IS:

1. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,  
the ink cartridge satisfying:

$$200 \leq N \cdot R \leq 320$$

where N is a cell density, expressed in the number of pores per inch, of the ink absorbing body before the ink absorbing body is contained in the ink containing section; and R is a compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing body is contained in the ink containing section.

2. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,  
the ink cartridge satisfying:

$$T \cdot N \cdot R \cdot B \geq 0.08$$

where T is a surface tension of the ink absorbed in the ink absorbing body, expressed in Newton per meter; N is a cell density, expressed in the number of pores per inch, of the ink absorbing body before the ink absorbing body is contained in the ink containing section; and R is a

compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing body is contained in the ink containing section; and B is a coefficient of  $B = 0.0161$ .

3. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$T \cdot N \cdot R \cdot B \geq \gamma \cdot h$$

where T is a surface tension of the ink absorbed in the ink absorbing body, expressed in Newton per meter; N is a cell density, expressed in the number of pores per inch, of the ink absorbing body before the ink absorbing body is contained in the ink containing section; and R is a compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing body is contained in the ink containing section; B is a coefficient of  $B = 0.0161$ ;  $\gamma$  is a specific gravity of the ink; and h is a maximum vertical head height, in meter, of the ink containing section relative to an ink supplying throat

oriented in an arbitrary position.

4. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$C \cdot \{\mu \cdot L \cdot Q \cdot (N \cdot R)^2 / S\} \leq T / D$$

where C is a coefficient of  $C = 1.88 \times 10^5$ ;  $\mu$  is a viscosity of the ink in Pa·s; L is a height in meter of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section; Q is a maximum amount of ink, expressed in cubic meter per second, ejected from a nozzle through which the ink containing section ejects ink; N is a cell density, expressed in the number of pores per inch, of the ink absorbing body before the ink absorbing body is contained in the ink containing section; R is a compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing body is contained in the ink containing section; S is a cross-sectional area of the ink absorbing body, expressed in square meter, when the ink absorbing body is contained in a compressed state in the ink containing section; T is a surface tension of the ink,

expressed in Newton per meter, absorbed in the ink absorbing body; and  $D$  is a diameter of the nozzle expressed in meter.

5. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$(k/A) \cdot Q \cdot (N \cdot R)^2 \cdot (\mu \cdot L) / S \leq 2000$$

where  $(k/A)$  is a coefficient of  $(k/A) = 7.52 \times 10^5$ ;  $Q$  is a maximum amount of ink, expressed in cubic meter per second, ejected from a nozzle through which the ink containing section ejects ink;  $N$  is a cell density, expressed in the number of pores per inch, of the ink absorbing body before the ink absorbing body is contained in the ink containing section;  $R$  is a compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing body is contained in the ink containing section;  $\mu$  is a viscosity of the ink in  $\text{Pa} \cdot \text{s}$ ;  $L$  is a height in meter of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section; and  $S$  is a cross-sectional area of the ink absorbing body, expressed in square meter, when

the ink absorbing body is contained in a compressed state in the ink containing section.

6. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,  
the ink cartridge satisfying:

$$200 \leq M \leq 320$$

where M is an actual cell density expressed in the number of cells per inch.

7. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,  
the ink cartridge satisfying:

$$T \cdot M \cdot B \geq 0.08$$

where T is a surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body; M is an actual cell density expressed in the number of cells per inch; and B is a coefficient of  $B = 0.0161$ .

8. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,  
the ink cartridge satisfying:

$$T \cdot M \cdot B \geq \gamma \cdot h$$

where T is a surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body; M is an actual cell density expressed in the number of cells per inch; B is a coefficient of  $B = 0.0161$ ;  $\gamma$  is a specific gravity of the ink; and h is a maximum vertical head height, in meter, of the ink containing section relative to an ink supplying throat oriented in an arbitrary position.

9. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,  
the ink cartridge satisfying:

$$Q \cdot M^2 \cdot (\mu \cdot L) \cdot C / S \leq T / D$$

where Q is a maximum amount of ink, expressed in cubic meter per second, ejected from a nozzle through which the ink containing section ejects ink; M is an actual cell density expressed in the number of cells per inch;  $\mu$  is a viscosity of the ink in Pa·s; L is a height in meter of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section; C is a coefficient of  $C = 1.88 \times 10^5$ ; S is a cross-sectional area of the ink absorbing body, expressed in square meter, when the ink absorbing body is contained in a compressed state in the ink containing section; T is a

surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body; and D is a diameter of the nozzle expressed in meter.

10. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of porous body for retaining ink,

the ink cartridge satisfying:

$$(k/A) \cdot Q \cdot M^2 \cdot (\mu \cdot L) / S \leq 2000$$

where  $(k/A)$  is a coefficient of  $(k/A) = 7.52 \times 10^5$ ; Q is a maximum amount of ink, expressed in cubic meter per second, ejected from a nozzle through which the ink containing section ejects ink; M is an actual cell density expressed in the number of cells per inch;  $\mu$  is a viscosity of the ink in Pa·s; L is a height in meter of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section; and S is a cross-sectional area of the ink absorbing body, expressed in square meter, when the ink absorbing body is contained in a compressed state in the ink containing section.

11. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$\{T \cdot S / (C \cdot D \cdot \mu \cdot L \cdot Q)\}^{0.5} \geq (N \cdot R) \geq \gamma \cdot h / (T \cdot B)$$

where T is a surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body; S is a cross-sectional area of the ink absorbing body, expressed in square meter, when the ink absorbing body is contained in a compression state in the ink containing section; C is a coefficient of  $C = 1.88 \times 10^5$ ; D is a diameter of a nozzle, expressed in meter, through which the ink containing section ejects ink;  $\mu$  is a viscosity of the ink in Pa·s; L is a height in meter of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section; Q is a maximum amount of ink, expressed in cubic meter per second, ejected from the nozzle; N is a cell density, expressed in the number of pores per inch, of the ink absorbing body before the ink absorbing body is contained in the ink containing section; R is a compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing body is contained in the ink containing section;  $\gamma$  is a specific gravity of the ink; and h is a maximum vertical head height, in meter, of the ink containing section relative to an ink supplying throat



oriented in an arbitrary position; and B is a coefficient of  $B = 0.0161$ .

12. An ink cartridge, comprising:

an ink containing section including an ink absorbing body made of a porous material for retaining ink, the ink cartridge satisfying:

$$\{T \cdot S / (C \cdot D \cdot \mu \cdot L \cdot Q)\}^{0.5} \geq M \geq \gamma \cdot h / (T \cdot B)$$

where T is a surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body; S is a cross-sectional area of the ink absorbing body, expressed in square meter, when the ink absorbing body is contained in a compressed state in the ink containing section; C is a coefficient of  $C = 1.88 \times 10^5$ ; D is a diameter of a nozzle, expressed in meter, through which the ink containing section ejects ink;  $\mu$  is a viscosity of the ink in Pa·s; L is a height in meter of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section; Q is a maximum amount of ink, expressed in cubic meter per second, ejected from the nozzle; M is an actual cell density expressed in the number of cells per inch;  $\gamma$  is a specific gravity of the ink; and h is a maximum vertical head height, in meter, of the ink containing section relative to an ink supplying throat oriented in an arbitrary position;

and B is a coefficient of  $B = 0.0161$ .

13. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$200 \leq N \cdot R \leq 320$$

where N is a cell density, expressed in the number of pores per inch, of the ink absorbing body before the ink absorbing body is contained in the ink containing section; and R is a compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing body is contained in the ink containing section.

14. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$200 \leq N \cdot R \leq 320$$

where N is a cell density, expressed in the number of pores per inch, of the ink absorbing body before the ink

absorbing body is contained in the ink containing section; and R is a compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing body is contained in the ink containing section.

15. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$T \cdot N \cdot R \cdot B \geq \gamma \cdot h$$

where T is a surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body; N is a cell density, expressed in the number of pores per inch, of the ink absorbing body before the ink absorbing body is contained in the ink containing section; and R is a compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing body is contained in the ink containing section; B is a coefficient of  $B = 0.0161$ ;  $\gamma$  is a specific gravity of the ink; and h is a maximum vertical head height, in meter, of the ink

containing section relative to an ink supplying throat oriented in an arbitrary position.

16. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous body for retaining ink,

the ink cartridge satisfying:

$$C \cdot \{\mu \cdot L \cdot Q \cdot (N \cdot R)^2 / S\} \leq T / D$$

where C is a coefficient of  $C = 1.88 \times 10^5$ ;  $\mu$  is a viscosity of the ink in Pa·s; L is a height in meter of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section; Q is a maximum amount of ink, expressed in cubic meter per second, ejected from a nozzle through which the ink containing section ejects ink; N is a cell density, expressed in the number of pores per inch, of the ink absorbing body before the ink absorbing body is contained in the ink containing section; R is a compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing body is contained in the ink containing section; S is a cross-sectional area of the ink absorbing body, expressed in square meter, when the ink

absorbing body is contained in a compressed state in the ink containing section;  $T$  is a surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body; and  $D$  is a diameter of the nozzle expressed in meter.

17. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$(k/A) \cdot Q \cdot (N \cdot R)^2 \cdot (\mu \cdot L) / S \leq 2000$$

where  $(k/A)$  is a coefficient of  $(k/A) = 7.52 \times 10^5$ ;  $Q$  is a maximum amount of ink, expressed in cubic meter per second, ejected from a nozzle through which the ink containing section ejects ink;  $N$  is a cell density, expressed in the number of pores per inch, of the ink absorbing body before the ink absorbing body is contained in the ink containing section;  $R$  is a compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing body is contained in the ink containing section;  $\mu$  is a viscosity of the ink in  $\text{Pa} \cdot \text{s}$ ;  $L$  is a height in meter of the ink absorbing body when the ink

absorbing body is contained in a compressed state in the ink containing section; and  $S$  is a cross-sectional area of the ink absorbing body, expressed in square meter, when the ink absorbing body is contained in a compressed state in the ink containing section.

18. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$200 \leq M \leq 320$$

where  $M$  is an actual cell density expressed in the number of cells per inch.

19. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$T \cdot M \cdot B \geq 0.08$$

where  $T$  is a surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body;  $M$  is an actual cell density expressed in the number of cells per inch; and  $B$  is a coefficient of  $B = 0.0161$ .

20. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous material for retaining,

the ink cartridge satisfying:

$$T \cdot M \cdot B \geq \gamma \cdot h$$

where T is a surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body; M is an actual cell density expressed in the number of cells per inch; B is a coefficient of  $B = 0.0161$ ;  $\gamma$  is a specific gravity of the ink; and h is a maximum vertical head height, in meter, of the ink containing section relative to an ink supplying throat oriented in an arbitrary position.

21. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$Q \cdot M^2 \cdot (\mu \cdot L) \cdot C / S \leq T / D$$

where Q is a maximum amount of ink, expressed in cubic meter per second, ejected from a nozzle through which the ink containing section ejects ink; M is an actual cell density expressed in the number of cells per inch;  $\mu$  is a

viscosity of the ink in Pa·s; L is a height in meter of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section; C is a coefficient of  $C = 1.88 \times 10^5$ ; S is a cross-sectional area of the ink absorbing body, expressed in square meter, when the ink absorbing body is contained in a compressed state in the ink containing section; T is a surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body; and D is a diameter of the nozzle expressed in meter.

22. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$(k/A) \cdot Q \cdot M^2 \cdot (\mu \cdot L) / S \leq 2000$$

where  $(k/A)$  is a coefficient of  $(k/A) = 7.52 \times 10^5$ ; Q is a maximum amount of ink, expressed in cubic meter per second, ejected from a nozzle through which the ink containing section ejects ink; M is an actual cell density expressed in the number of cells per inch;  $\mu$  is a viscosity of the ink in Pa·s; L is a height in meter of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section; and S



is a cross-sectional area of the ink absorbing body, expressed in square meter, when the ink absorbing body is contained in a compressed state in the ink containing section.

23. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$\{T \cdot S / (C \cdot D \cdot \mu \cdot L \cdot Q)\}^{0.5} \geq (N \cdot R) \geq \gamma \cdot h / (T \cdot B)$$

where T is a surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body; S is a cross-sectional area of the ink absorbing body, expressed in square meter, when the ink absorbing body is contained in a compressed state in the ink containing section; C is a coefficient of  $C = 1.88 \times 10^5$ ; D is a diameter of a nozzle, expressed in meter, through which the ink containing section ejects ink;  $\mu$  is a viscosity of the ink in Pa·s; L is a height in meter of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section; Q is a maximum amount of ink, expressed in cubic meter per second, ejected from the nozzle; N is a cell density, expressed in the number of pores per inch, of the ink absorbing body

before the ink absorbing body is contained in the ink containing section;  $R$  is a compressibility, which is a volume ratio of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section to the ink absorbing body before the ink absorbing section is contained in the ink containing section;  $\gamma$  is a specific gravity of the ink; and  $h$  is a maximum vertical head height, in meter, of the ink containing section relative to an ink supplying throat oriented in an arbitrary position; and  $B$  is a coefficient of  $B = 0.0161$ .

24. An image forming apparatus comprising an ink cartridge that includes:

an ink containing section including an ink absorbing body made of a porous material for retaining ink,

the ink cartridge satisfying:

$$\{T \cdot S / (C \cdot D \cdot \mu \cdot L \cdot Q)\}^{0.5} \geq M \geq \gamma \cdot h / (T \cdot B)$$

where  $T$  is a surface tension of the ink, expressed in Newton per meter, absorbed in the ink absorbing body;  $S$  is a cross-sectional area of the ink absorbing body, expressed in square meter, when the ink absorbing body is contained in a compressed state in the ink containing section;  $C$  is a coefficient of  $C = 1.88 \times 10^5$ ;  $D$  is a diameter of a nozzle, expressed in meter, through which the ink

containing section ejects ink;  $\mu$  is a viscosity of the ink in Pa·s;  $L$  is a height in meter of the ink absorbing body when the ink absorbing body is contained in a compressed state in the ink containing section;  $Q$  is a maximum amount of ink, expressed in cubic meter per second, ejected from the nozzle;  $M$  is an actual cell density expressed in the number of cells per inch;  $\gamma$  is a specific gravity of the ink; and  $h$  is a maximum vertical head height, in meter, of the ink containing section relative to an ink supplying throat oriented in an arbitrary position; and  $B$  is a coefficient of  $B = 0.0161$ .